Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claims 1-31 (canceled)

Claim 32 (previously presented): A method of producing electrical energy, comprising:

forming a thin electrically conducting surface on one or more semiconductor elements, the thin electrically conducting surface and the one or more semiconductor elements forming a semiconductor diode;

forming a region for chemical reactions, the region including at least the thin electrically conducting surface;

conveying reactants into the region;

initiating one or more chemical reactions in the region, the chemical reactions producing one or more highly vibrationally excited reaction products; and

removing exhaust and one or more products of the chemical reactions from the region by gas convection,

wherein the one or more highly vibrationally excited reaction products transfer reaction product energy to electrons in the thin electrically conducting surface, which electrons become energetic, travel into the one or more semiconductor elements and produce electrical energy.

Claim 33 (previously presented): The method of claim 32, further comprising:

tailoring one or more properties of the semiconductor diode to enhance one-way transport of the electrons in the thin electrically conducting surface to the one or more semiconductor elements.

Claim 34 (previously presented): The method of claim 33, wherein the semiconductor diode comprises a Schottky diode; and

the tailoring one or more properties comprises tailoring barrier width of the Schottky diode for enhancing tunneling of the electrons from the thin electrically conducting surface to the one or more semiconductor elements.

Claim 35 (previously presented): The method of claim 34, wherein the tailoring barrier width comprises choosing a semiconductor doping between high limit of degenerative doping and lower limit of light doping.

Claim 36 (currently amended): The method of claim 34, wherein the semiconductor diode comprises a platinum – TiO2 diode whose doping range is between 10^{15} and 10^{18} per cubic centimeter.

Claim 37 (currently amended): The method of claim 34, wherein the semiconductor diode comprises a platinum – SiC diode whose doping range is between 10^{15} and 10^{18} per cubic centimeter.

Claim 38 (currently amended): The method of claim 34, wherein the semiconductor diode comprises a platinum – GaN diode whose doping range is between 10^{15} and 10^{18} per cubic centimeter.

Claim 39 (previously presented): The method of claim 33, wherein the semiconductor diode comprises a pn junction diode; and the forming a thin electrically conducting surface comprises forming a thin electrically conducting surface on a highly doped or degeneratively doped p-type semiconductor and a junction between the thin electrically conducting surface and the highly doped or degeneratively doped p-type semiconductor forms an ohmic or almost ohmic contact; and the tailoring one or more properties comprises tailoring bandgap of the pn junction diode to create a barrier profile.

Claim 40 (previously presented): The method of claim 39, wherein the tailoring bandgap comprises varying composition of the one or more semiconductor elements as a function

of distance from the junction between the thin electrically conducting surface and the highly doped or degeneratively doped p-type semiconductor.

Claim 41 (previously presented): The method of claim 40, wherein the vaying comprises periodically varying the bandgap for forming quantum wells with energy levels chosen to match one or more energy levels of the products of the chemical reactions.

Claim 42 (previously presented): The method of claim 40, wherein the varying comprises periodically varying the bandgap for forming potential wells whose minima approximately match an excitation energy of the products of the chemical reactions in the vicinity of the thin electrically conducting surface.

Claim 43 (previously presented): The method of claim 40, wherein the semiconductor elements comprise germanium and silicon and composition of the silicon is varied.

Claim 44 (previously presented): The method of claim 32, further comprising:

cooling the one or more semiconductor elements by convective flow, heat of vaporization, or conduction, or combination thereof.

Claim 45 (previously presented): The method of claim 44, wherein the forming a thin electrically conducting surface comprises forming a thin electrically conducting surface on one or more semiconductor elements, the thin electrically conducting surface and the one or more semiconductor elements forming at least one of a semiconductor diode and a capacitor or combination thereof, wherein the electrons cause a useful potential across the semiconductor diode or the capacitor.

Claim 46 (currently amended): The method of claim 45, wherein the useful potential across the semiconductor_diode comprises a forward bias across the semiconductor diode.

Claim 47 (previously presented): The method of claim 45, wherein the useful potential across the capacitor comprises a voltage across the capacitor.

Claim 48 (previously presented): The method of claim 44, wherein the heat of vaporization comprises heat of vaporization of one or more reactants, liquids, fuels, or additives, or combination thereof.

Claim 49 (previously presented): The method of claim 44, wherein the convective flow comprises using a flow of air, the reactants, the products of chemical reactions, fuels, liquids, or additives, or combination thereof.

Claim 50 (previously presented): The method of claim 44, wherein the convective flow comprises using a heat pipe that uses heat of vaporization to remove heat from the semiconductor diode or the region or combination thereof to cool the one or more semiconductor elements.

Claim 51 (canceled).

Claim 52 (previously presented): The method of claim 44, further comprising integrating the semiconductor diode as a part of a system that performs the conveying step.

Claim 53 (previously presented): The method of claim 44, further comprising integrating the semiconductor diode as a part of a system that performs the removing step.

Claim 54 (previously presented): The method of claim 44, further comprising integrating the semiconductor diode as a part of a system that performs the conveying step and the removing step.

Claim 55 (canceled).

Claim 56 (previously presented): The method of claim 44, wherein the conveying comprises conveying reactants into the region by pulsed delivery such that one or more

reaction products are allowed to desorb and conveyed out of the region during the period between the pulsed delivery.

Claim 57 (previously presented): The method of claim 44, wherein the initiating comprises stimulating one or more reactions in the region by using a catalyst, injecting a stimulant, injecting an autocatalyst, injecting hot carrier, using electrical stimulant, using optical stimulant, or using a plurality of reactants, or combination thereof.

Claim 58 (previously presented): The method of claim 32, further comprising:

preparing the reactants prior to producing the one or more highly vibrationally excited reaction products.

Claim 59 (previously presented): The method of claim 58, wherein the preparing comprises reforming, desorbing, adsorbing, reacting, modifying one or more chemical properties of the reactants, condensing, or vaporizing, or combination thereof, by using one or more catalysts, separated catalysts, reaction stimulators, separated regions, or multiple regions, or combination thereof.

Claim 60 (previously presented): The method of claim 58, wherein the preparing comprises using a catalyst and a reactant to provide energy for vaporization.

Claim 61 (previously presented): The method of claim 58, wherein the preparing is performed intermittently in pulses or periodically.

Claim 62 (previously presented): The method of claim 32, further comprising tailoring spent or unused reaction products for conveyance to an exhaust.

Claim 63 (previously presented): The method of claim 62, wherein the tailoring spent or unused reaction products comprises desorbing, adsorbing, reacting, modifying chemical properties of the spent or unused reaction products, condensing, or vaporizing, or

combination thereof, by using a catalyst, separated catalysts, reaction stimulator, separated regions, or multiple regions, or combination thereof.

Claim 64 (previously presented): The method of claim 62, wherein the tailoring is performed intermittently in pulses or periodically.

Claim 65 (previously presented): The method of claim 62, wherein the catalyst comprises aluminum.

Claim 66 (previously presented): The method of claim 62, wherein the reaction stimulator comprises periodic pulses of H_2O_2.

Claim 67 (previously presented): The method of claim 62, wherein reaction stimulator comprises reactants that burn the spent or unused reaction products.

Claim 68 (previously presented): The method of claim 32, further comprising using a catalyst with a low affinity for reacted products, the catalyst being used to prepare for and enhance the producing of the one or more highly vibrationally excited reaction products and to tailor the reacted products for the removing.

Claim 69 (previously presented): The method of claim 68, wherein the catalyst with a low affinity for reacted products comprises platinum, palladium, or gold, or combination thereof.

Claim 70 (previously presented): The method of claim 32, wherein the removing exhaust and reacted products comprises:

flowing gaseous reactants into the region for chemical reactions; and

providing an exhaust path from the region.

Claim 71 (previously presented): The method of claim 32, wherein the removing exhaust and reacted products comprises:

removing spent reactants from the thin electrically conducting surface.

Claim 72 (previously presented): The method of claim 71, wherein the removing spent reactants comprises using a catalyst as part of the thin electrically conducting surface.

Claim 73 (previously presented): The method of claim 71, wherein the removing spent reactants comprises applying periodic stimulation to the thin electrically conducting surface.

Claim 74 (previously presented): The method of claim 73, wherein the stimulation comprises heat, electrical, optical, mechanical, ultrasonic, or hot carrier injection stimulation, or combination thereof.

Claim 75 (previously presented): The method of claim 32, wherein the conveying reactants comprises conveying reactants that produce highly vibrationally excited reaction products.

Claim 76 (previously presented): The method of claim 75, wherein the reactants comprises one or more of monopropellants, or unstable energetic specie, or combination thereof.

Claim 77 (previously presented): The method of claim 76, wherein the reactants comprise monomethylhydrazine or high explosives, or combination thereof.

Claim 78 (previously presented): The method of claim 32, wherein the thin electrically conducting surface is formed as substantially flat.

Claim 79 (previously presented): The method of claim 32, wherein the thin electrically conducting surface is formed as having monolayer features.

Claim 80 (previously presented): The method of claim 32, wherein the thin electrically conducting surface is formed as having substantially stepped and edge features.

Claim 81 (previously presented): The method of claim 32, wherein the thin electrically conducting surface is formed from platinum, palladium, gold, rhodium, or ruthenium, or combination thereof.

Claim 82 (previously presented): The method of claim 32, wherein the thin electrically conducting surface is formed on an intermediate surface.

Claim 83 (previously presented): The method of claim 82, wherein the intermediate surface comprises metal or oxide or combination thereof.

Claim 84 (previously presented): The method of claim 32, wherein the one or more semiconductor elements comprise photovoltaic energy converter devices, metal-insulator-metal devices, metal-oxide-metal devices, or quantum wells, or combination thereof.

Claim 85 (previously presented): The method of claim 32, wherein at least one of the one or more semiconductor elements are chosen from those with band gap greater than approximately 1.0 eV.

Claim 86 (previously presented): The method of claim 32, wherein the one or more semiconductor elements comprise a catalyst oxide, a high temperature wide band gap semiconductor, or combination thereof.

Claim 87 (previously presented): The method of claim 86, wherein the catalyst oxide comprises TiO_2.

Claim 88 (previously presented): The method of claim 86, wherein the high temperature wide band gap semiconductor comprises SiC, GaN, GaP, diamond, or ZnO, or combination thereof.

Claim 89 (previously presented): The method of claim 86, wherein the one or more semiconductor elements comprise silicon or GaAs or combination thereof.

Claim 90 (canceled).

Claim 91 (canceled).

Claim 92 (previously presented): The method of claim 32, wherein at least one of the semiconductor elements is in contact with the thin electrically conducting surface and has a bandgap greater than bandgaps of rest of the semiconductor elements.